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Storm Chamber Technology for Storm Water Storage and Gray Water Management and Reuse

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EMERGING CONSTRUCTION TECHNOLOGIES

Other Technologies – Water/Waste Systems

STORM CHAMBER TECHNOLOGY FOR STORM WATER STORAGE AND GRAY WATER MANAGEMENT AND REUSE

THE NEED

Storm Chamber™ and Sediment Trap™ are two new technologies developed by HydroLogic Solutions Inc. Waste water from households can be categorized as black water and gray water. Additionally, storm water runoff from the roof can be considered as a form of "waste" water. The gray water component and storm water requires relatively lesser treatment for reuse. The construction industry needs green solutions so that this waste water and storm water can be recycled and utilized for various purposes. The water contaminants can now be allowed to settle out and naturally degraded to non-toxic byproducts so that the water can be reused with the integrated Storm Chamber™ and Sediment Trap™ technologies.

THE TECHNOLOGY

StormChamberTM is an open bottom, arch-shaped, HDPE infiltration chamber which functions in both permeable and non-permeable soils for subsurface retention, detention, recharge and reuse of storm water, or gray water, designed to overcome the deficiencies of other technologies.

FIGURE 1 STORM CHAMBER

It provides a higher level of nutrient and pollutant removal by taking advantage of the natural biological and physical properties of the soil. StormChamber™ systems mimic pre-development conditions by putting post-construction run off back into the ground approximately where it used to go, maintaining base flow to streams, wetlands, lakes, ponds and countering salt-water intrusion in coastal areas. During "normal" conditions, approximately 50% of stream flow is from base flow. Base flow comprises 100% of

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stream flow during low flow periods. The SedimenTrap™ component of the StormChamber™ system eliminates the need for pre-treatment devices and provides a more effective level of sediment and debris removal and retention at a fraction of the cost. StormChamber™ is also surprisingly strong, exceeding the AASHTO H-20 wheel load rating by three times.

FIGURE 2 STORM CHAMBER INSTALLATION IN PROGRESS

The chambers are light weight, less expensive, quicker and easier to install than similar technologies. They are installed individually or in groups. A SedimenTrap™ is placed under the first and last chamber of the row receiving the inflow.

FIGURE 3 SEDIMENT TRAP INSTALLED BELOW THE SEDIMENT CHAMBER

A 10" vertical access PVC riser is attached to the chamber directly above the SedimenTrap™. Through these risers, vacuum trucks are used to pull out debris and sediments captured within the SedimenTrap™.

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The chambers are open on the bottom and act like a septic drain field. A biomat of micro-organisms forms on the soil and stone underlying the chambers, which metabolizes pollutants and converts nutrients to non-contaminating byproducts.

FIGURE 4 STANDARD AND REUSE APPLICATIONS OF THE STORM CHAMBER

THE BENEFITS

The panel covers:

- Improve the quality of drainage water.
- Replicates pre-construction hydrology.
- Less chamber footprint area.
- Efficient sediment management.
- Easy, quick and inexpensive to install.
- One StormChamberTM stores as much as 10 rain barrels, at less cost and is visually unobtrusive.
- Helps counter drought conditions by maintaining groundwater base flow to streams.
- Eliminates thermal discharge loadings.
- Replenishes groundwater supplies.
- Achieves higher pollutant removal rates through soil filtration and accelerated microbial actions (bio-remediation).
- Achieves Low Impact Development, LEED and Zero Discharge goals.
- Provides a lower cost and longer effective life alternative to perforated pipe.
- Provides a lower cost alternative to drainage pipe for conveyance, with added benefits of groundwater recharge and water quality enhancement.
- Helps obtain up to 18 LEED points.
- Exceeds AASHTO-H-20 Wheel Load Rating by three times.

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STATUS

StormChambers™ replace conventional storm water retention/detention systems such as ponds, pipe and stone trenches or beds, or concrete structures. The chambers may also be used for drywells. StormChambers™ may be installed in trench or bed configurations according to site restrictions or client preference. Their perforated sidewalls and full open bottom promote maximum infiltration capability and allow for the transfer of high volumes at low velocity. The chambers are typically installed subsurface beneath parking areas to capitalize on use of space; however, they may also be placed in grassy areas.
StormChambers™ significantly contribute to low impact/sustainable development goals, watershed management, and add points for LEEDS certification. Up to 18 LEED points can be obtained using the StormChamber™ system. It also complies with the new EPA Phase II storm water and Total Maximum Daily Load (TMDL) regulations set for various municipalities.

POINT OF CONTACT

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REFERENCES

HydroLogic Solution website: http://www.stormchambers.com

REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

Purdue University does not endorse this technology or represents that the information presented can be relied upon without further investigation.

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